GEOGRAPHIC NEWS BULLETIN

Prepared Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

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General Headquarters, Washington, D. C.

for

DEPARTMENT OF THE INTERIOR

Bureau of Education

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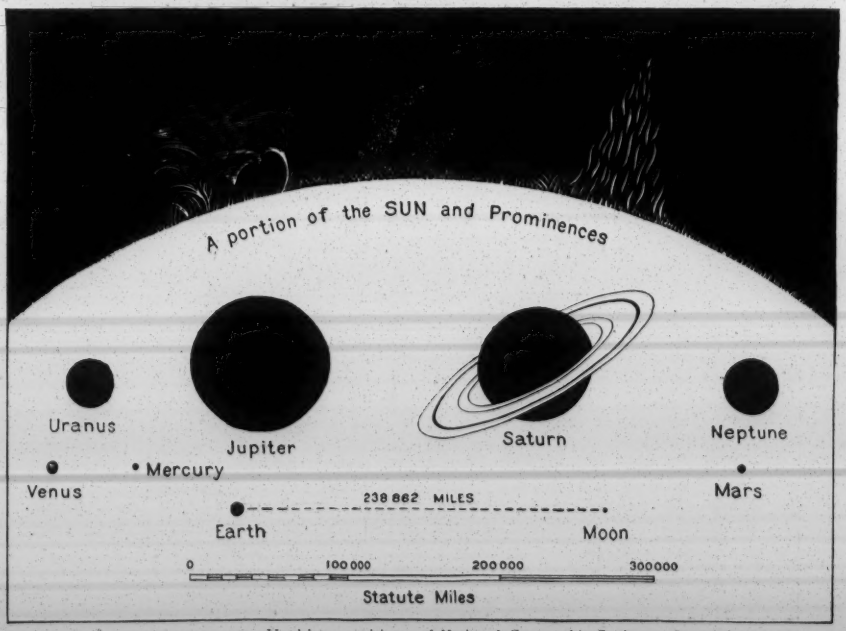

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CHART SHOWING THE RELATIVE SIZE OF THE SUN, MOON, AND MAJOR PLANETS

The stupendous size of the sun in comparison with the several members of its planetary family is emphasized by the distance of the moon from the earth as here plotted on the face of the sun. The differences in their sizes play peculiar tricks of gravity. A hundred pounds would weigh 2,764 pounds on the sun, 252 pounds on Jupiter, 36 pounds on Mars, and 16 pounds on the moon. Spots on the face of the sun are often six times the diameter of the earth, and prominences frequently reach so far into space that they would completely envelop our moon if they started from the earth.

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The Story of the Stars

DEALING with distances in the endless reaches of space where a million miles are but as an inch in terrestrial measurements; studying worlds that are as much larger than ours as a mountain is bigger than an ant hill; gauging the velocities of celestial travelers that outfly the speediest Spad that ever chased a Hun as an express train outruns a snail; reckoning with forces that make the tremendous eruptions of a Katmai seem weaker than the bursting of a mustard seed, the astronomer is an explorer of realms that overpower the layman's comprehension and overwhelm his imagination."

With this introduction William Joseph Showalter writes a communication to the National Geographic Society which describes the geography of the sky as follows:

"But luckily this layman can check up the celestial geographer in a way at once dramatic and convincing. The grapes brought back by Joshua when he was sent to spy out the Promised Land were not half as sure a corroboration of his story as are the fulfilled prophecies the astronomer brings back from his incursions into the depths of space.

First Witness for the Defense

"Does he know what he is talking about? Let us put him on trial and see. Our witnesses shall be heavenly bodies and forces themselves. The first one we shall call, out of the thousands who could testify, is a comet—Halley's. Here is its evidence:

"'Yes, I'm a comet. For countless generations I had been swinging through space. When I approached the earth men believed me a messenger of evil. They knew precious little about me or my kind. In 1682 I appeared on one of my excursions into realms bounded by the earth's orbit. A little before that Sir Isaac Newton had worked out the fundamental principle of celestial mechanics, namely, the law of gravitation.

"'He had a friend by the name of Halley. This man undertook to see whether or not I was subject to that law, and whether, indeed, Newton's interpretation of it was correct. Looking back over the twenty-four comets that had been recorded as invading the precincts of space set aside for the earth, he found that three of them had traveled a similar path and all the others diverse paths.

"'Applying Isaac Newton's law to me, he said that I was traveling thirty-four miles a second when I was nearest the sun, and that I had turned round and was headed for the regions whence I had come. He said I would travel out into space some three billion miles, my gait slowing down as I journeyed, and that when I got ready to make the turn to come back I would be loafing along at the celestial snail's pace of a mile a second.

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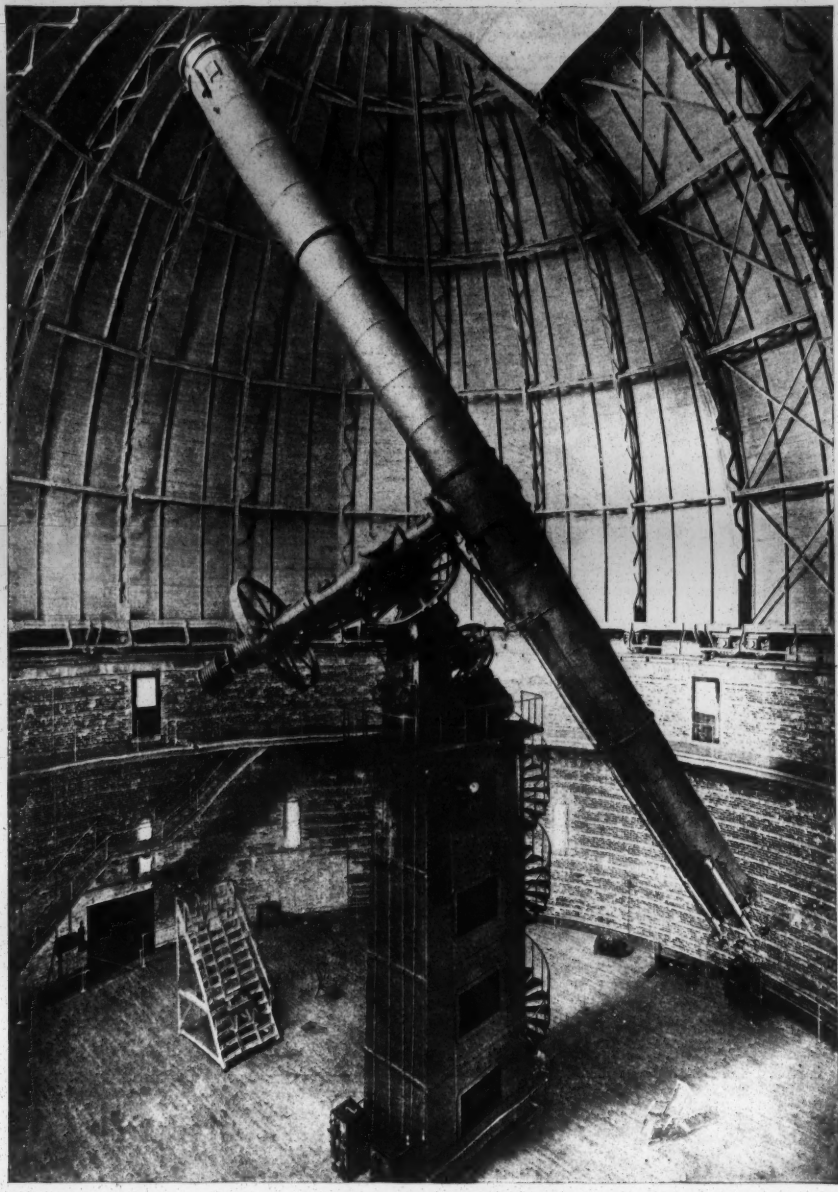

Photograph from Yerkes Observatory

THE LARGEST REFRACTING INSTRUMENT IN THE WORLD, THE YERKES 40-INCH TELESCOPE

This "big gun" of the astronomical world is a giant's eye, 40,000 times as powerful as the human optic. A human eye to be as powerful as it is would have to be 25 feet in diameter, and the man who could possess such an eye would have to be 1,200 feet high.

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How Glass Is Made

(This bulletin is recommended for use in science classes)

DO YOU know how steel, or cloth, or shoes, or cement, are made? Many articles you use daily represent centuries of study and experiment, and require great skill and complicated machinery in their manufacture. This bulletin, first of a series on "How Things Are Made," is extracted from an article by John Oliver La Gorce, in the National Geographic Magazine:

"To say that civilization's advancement is based on glass seems a gross exaggeration at first blush, and yet, when one reflects how many sciences and how much human knowledge came to the race through that commodity, the accuracy of the statement is apparent. The science of preventive medicine was born of the microscope. But for the telescope and the spectroscope the world would know about as much of astronomy as was known by the shepherds on the plains of Persia. One may read the whole list of technological industries without discovering lines of endeavor where glass does not play an essential role.

"It was Pennsylvania that fostered the manufacture of this commodity in America, and it is from Pennsylvania today that the American people get a third of their supply.

Taking Liberties With Mother Nature

"The processes of manufacturing glass are extremely interesting. To see sand, soda, and lime mixed, subjected to heat, and turned into glass as transparent as the clearest water, or even as the very air itself, shows what liberties man has learned to take with Nature. Now as free-flowing as water, now as sticky as warm taffy, now as hard as flint, it lends itself to the manipulation of human hands and the purposes of man with astonishing versatility.

"The mixed materials, technically known as the 'batch,' consist of white sand and such bases as potash, soda, lime and lead. Small quantities of other materials are added as auxiliaries to change the color or nature of the glass. Manganese and arsenic are among the agents employed to make it colorless. For window glass a batch may be made up of 8,000 parts sand, 2,200 of soda sulphate, 2,500 of lime, 50 of arsenic, and 40 of powdered coal; or the amount of lime may be cut down and carbonate of soda substituted.

"Window glass is of two kinds—cast and blown. The cast is the plate-glass of commerce. In making it the process is not dissimilar to the rolling of dough on a dough-board. A huge flat table, with a rim around the edge, is filled with a pile of hot, putty-thick glass. A big mechanical rolling pin spreads it out, after which it hardens. Then it is sent to the annealing furnace, heated, and allowed to cool gradually, for cooling either too fast or too slow would be ruinous. Finally it is ground down and polished and is ready for shipment.

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"'Furthermore, he figured out my mass and many other details about me. Then he said that if he was right I would come back in about seventy-six years, the exact month of my coming depending on how much influence Jupiter and other planets would have upon me, which he had not had time to calculate.

"'I knew that he had fathomed my mystery and solved my secret. But the people of the earth did not. They said, "Oh, yes; Halley is a cheap-John notoriety seeker. He is trying to get fame by a prediction that will attract attention, but he postpones the date of the comet's reappearance to a time when he is dead and his forecast forgotten!"

"'But Halley "stood pat" and called on an impartial posterity to witness that it was an Englishman who had first predicted the return of a comet. Sure enough, in the language of the street, "he had my number." With less proportionate departure from his schedule than the Congressional Limited makes in its Washington-New York run, I reappeared, having traveled some seven billion miles in the interim. So I have to admit that Halley must have known what he was talking about.'

Outdoes Halley's Seven Billion Mile "Hike"

"The next witness is a star—Sirius by name. His evidence may be somewhat self-incriminating, but perhaps it is even more valuable therefor. It makes the seven billion miles that Halley's comet travels between its earthly visits seem only a morning constitutional. Here's his testimony:

"'For untold centuries I had been shining down upon the sons of men with my bluish-white light. I was the king of kings of the starry empire, ruling my own constellation, *Canis Major,* and at the same time excelling all of the other stars in the heavens for brightness. I am third among the fixed stars—that is, those outside the solar system—in nearness to the earth, but I was to men only a star and nothing more. They called me the "Dog Star," and said my constellation was one of the hounds of Orion.

"'But one day that man they call Edmund Halley got to studying my habits. He made a series of notations in the year 1718 to the effect that I was not behaving as fixed stars are supposed to deport themselves, drawing attention to the fact that I frequently changed my position on the path I was traveling. He hinted that it might be that I was departing from the straight and narrow way, though he made no charges that such was the case.

This Star the Gay-Dog of the Heavens

"'More than a century later another astronomer came along—Bessel was his name—and he undertook to interpret my behavior. Although I was forty-seven trillion miles away from him, he and his pupil, Peters, pronounced me a "gay dog," with an affinity they could not see, though only because they lacked telescopes powerful enough. They said my affinity and I were coming in the sun's direction, overtaking that luminary at the rate of nearly six miles a second, and that we traveled around a common center of gravity once every 48.8 years.

"'Another half century passed, and meanwhile telescopes were undergoing improvement. The circumstantial evidence against me was mighty strong, but still no one had yet seen my affinity, and I felt pretty safe. Then came along that gifted optician, Alvan G. Clark. He was adjusting what is now the Dearborn Observatory telescope. When he trained that instrument on me, I saw that the jig was up with my secret. My affinity herself was seen, and I have to admit that Bessel and Peters knew what they were talking about.'"

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Foochow: An Inland Port

FOOCHOW, which figured in the news recently because of a clash between Chinese and Japanese, is an inland Bremen of the Pacific, situated on the river Min, the Hudson of south China.

The Catskills of the Min, which include numerous hills about Foochow, are storied by scores of Washington Irvings, and the legends, centuries old, are completely credited by a people who seem, to the occidental mind, at once the most matter-of-fact and the most imaginative in the world.

This busy "port," whose annual export of tea alone once reached nearly 100,000,000 pounds, is 35 miles from the sea, 3 miles from the river that furnishes its ocean outlet, and the river is not navigable for large vessels nearer than 10 miles below the point where suburbs of the walled town touch its lazy course.

Commerce Thrives Without Railroads or Good Highways

Moreover, Foochow's commerce thrives without the aid of railroads, or any good highways. To reach it the traveler must go by boat, from Shanghai or Hongkong, steam up the Min for 25 miles to the Pagoda anchorage, and then take a steam launch to a Foochow pier. Nowadays motor busses compass the remaining distance, from the waterfront to the walled city, but they still are novelties enough to attract curious crowds of unkempt children, not yet trained to the sophistication of the older Chinaman, who is seldom betrayed into acknowledging that aeroplanes, electric lights, and wireless telegraphy are not his racial heritages.

One should not hurry into Foochow proper, even if one could, for to do so would be to miss the physical beauties and fabled history that accentuate each step of the journey from the ocean to this vicarious port. Along the Min one may see pearl divers. Should a diver be drowned his fellows stoically conclude that he has fallen a victim to the sea turtle, Chinese equivalent for the legendary sea serpent of the west.

Near Pagoda anchorage rises Sharp Peak, capped by a tower built by a wife to welcome home an oriental Enoch Arden who, when he saw it, thought he had mistaken the river and sailed away again, never to return. A mandarin's footprint in a rock commemorates the summary punishment of quarrymen who kept right on chopping away its companion footprint, despite the flow of blood that spurted out at each stroke. When removed to a place in a bridge it registered a protest by kicking its bearers into the river, so the companion was not molested.

Example of Chinese Inertia

The river's obstruction at Pagoda anchorage is artificial; formed when stone-laden barges were sunk there to prevent a French fleet from reaching the city, during the Franco-Foochow troubles in 1884. It is characteristic of

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He's Forever Blowing Bubbles

"The process of making blown window glass is entirely different. In hand-blowing, after the batch has been melted, the 'gatherer' takes a pipe about five feet long, with a bell-shaped head at one end and a mouthpiece at the other, and dips the bell-shaped end into the molten glass. A small ball of the glass adheres. He blows through the pipe and transforms this ball into thick-skinned bubble. When this cools sufficiently it is dipped into the molten glass again, and more adheres. The process is usually repeated five times, the bubble growing thicker of skin each successive time.

"The pipe, with its adhering plastic bubble, is then given to a 'snapper,' or helper, who carries it to the 'blower's block,' where the 'blower' takes it. The latter workman is the king bee of the glass industry—big of body, powerful of lung, and deft of hand. He places the bubble in the 'block,' which is an iron mold set in water to prevent its becoming too hot, and lined with charcoal to keep the iron from discoloring the glass.

"By turning the bubble in the block, blowing air into it as he does so, and gradually drawing the pipe upward, he slowly transforms it into a pear-shaped affair. The lower part gradually becomes solid and too hard to be workable even with his powerful lungs. The snapper puts it into the blow furnace, and when it is properly heated he gives it back to the blower. Standing over the 'swing hole,' the blower allows the weight of the plastic glass to elongate the pear into a cylinder, which he gives the diameter by blowing into it intermittently.

"But although it has reached the desired diameter, the cylinder is not yet long enough to suit his purpose. So he reheats it and blows it over and over again until it attains the prescribed length.

When Cold Is Literally "Cutting"

"At this stage the cylinder is completed, but the free end is closed and the other end still adheres to the blowpipe. It is put back into the blow furnace and the free end heated until it is soft enough to permit the blowing of a hole through it. The resulting imperfect end is cut away by wrapping a hot glass thread around the cylinder above the imperfection, at the point of severance. Touched with a piece of cold iron, the imperfect section breakes asunder. The cylinder is freed from the blowpipe in a similar manner.

"We now have a perfect hollow cylinder of regulation window glass. But before it can be used in a window it must be flattened. To accomplish this it must first be split open. A hot iron or a charged electric wire, passed up and down the line of cleavage, plays the role of a pair of shears. It causes a strain-line to form from one end of the cylinder to the other, and when this is touched with a piece of cold iron the big roll breaks open as perfectly as though it were cut open with a diamond cutter and straight-edge.

"After this the roll of glass is sent to the annealing furnace. Heated to a proper degree, the glass becomes soft enough to permit the roll to be flattened. It is then carefully cooled and stored, ready for market.

"By the hand-blowing process cylinders up to as much as six feet long and nineteen inches in diameter can be blown. Machine blowers have been gradually substituted and have revolutionized the art of making flat glass.

"In simple terms a machine blower is an apparatus which automatically dips a big pipe into a kettle of molten glass, and then gradually raises it, pulling all the molten glass upward as the pipe rises. A constant stream of air kept flowing in through the pipe causes the glass to assume the form of a cylinder. Dip a soda straw into a thimbleful of molasses and blow through the straw as you lift it up from the molasses—that process would roughly duplicate the principle of the mechanical glass blower."

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Egypt: A Rip Van Winkle of History

(This is the second of a series of bulletins on the places and peoples of Africa.)

EGYPT, which is very much in the limelight just now because of the Egyptian home rule agitation, is a perennial Rip Van Winkle of history.

James Baikie, writing to the National Geographic Society, concerning this land, said:

"We owe the framework into which we try to fit the facts of Egyptian history to the ancient historian, Manetho, scattered fragments of whose history of Egypt, dating from the third century, B. C., have come down to us in the works of various ancient authors. He recognized thirty dynasties of Egyptian monarchs.

"Manetho's assertion that one of the early kings was slain by a hippopotamus, and that in the reign of another the Nile flowed with honey, may be mere fables, but the men were there, and their royalty was a very real and tangible thing. Since the early nineties investigations have been carried out which have resulted in the discovery of the tombs of many of these ancient royalties, and the accumulation of a most interesting mass of information with regard to the civilization of their time, the organization of their courts, and the attainments of the race over which they ruled.

Early Kings Built No Pyramids

"The kings of the earliest dynasties reared no pyramids. Their tombs were great structures mainly underground—that of Aha (who is possibly Mena, the first king of Egypt) at Naqada measures 175 feet by 88, and contains 21 chambers, built sometimes of brick, with a lining of wood, and sometimes floored with stone, as in the case of the tomb of King Den, at Abydos, whose granite floor furnishes the earliest known example of the use of stone in building.

"The furniture of the tombs reveals an amazing proficiency in the arts and crafts. Ebony chests, inlaid with ivory, stools with ivory feet carved in the shape of bull's legs, vessels cut and ground to translucent thinness, not only out of soft alabaster, but out of an iron-hard stone like diorite, finely wrought copper ewers, all tell us that the Egyptian of the earliest dynastic period was no rude barbarian, but a highly civilized craftsman. Perhaps the daintiest and most convincing evidence of his skill is given by the bracelets which were found encircling the skeleton arm of the queen of King Zer, of the first dynasty, which, alike for the grace of their design and for the skill with which the gold is wrought and soldered, are admirable.

"The civilization of the Nile Valley no longer challenges us with the Great Pyramid as the first essay of its development, or seems to spring full-grown like Athene from the head of Zeus. Petrie places the beginnings of the first dynasty at 5510 B. C., while another school brings them down to 3400 B. C.

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the Chinese love for the status quo that Foochow business men have waited so long to take steps to clear the channel and thus avoid the endless annoyance of constant reloading of cargoes. Measures now are being considered to connect Foochow with the sea by a channel fit for ocean-going vessels. Boards of trade and rivers and harbor congresses are recent civic concomitants of the nation that built the greatest inland waterway the world has known—the Grand Canal.

But the most conspicuous lack of Foochow, your nose would know, upon entering the congested streets of the walled city, is a board of health. It has been said that, for "offensiveness to the senses" no town can compare with Foochow. The older streets are so narrow, and so tortuous, for the most part, that wheeled vehicles cannot traverse them, and even were they wider their surface would be too uneven for passage. Broad streets, newly paved, now traverse many sections. Underground sewers have a habit of flowing forth into these cramped thoroughfares, and the sun's purifying rays are estopped by roofs from reaching many of them. Children, pigs and dogs commingle about many doorways; cholera occasionally reaps an indiscriminate harvest of man and beast, as it did only last summer when the local supply of coffins soon was used up and bodies were carried off in baskets.

Population Nearly That of Boston, Mass.

The older city is enclosed by a wall some thirty feet high, twelve feet thick, and its circuit of five miles is pierced by seven fort gates, one of these being the North Tower, at which are curious spirit shrines. The population of "Greater Foochow," including its numerous suburbs, is estimated at nearly 700,000. It is the capital of the province of Fukien, which produces the tea that makes Foochow important, where tigers are to be hunted, and where formerly grew the poppies which made it notorious in the days when there were said to be more opium dens than tea and rice shops in the city.

Conspicuous proof that Foochow is capable of civic reform, when once stirred, was its campaign against opium, conducted with posters and orators, after the manner of a local option drive in the wetter days of our own country. The campaign was successful, first in having a license and permit system established, and ultimately in banishing the dens, in 1907.

Foreigners live on a picturesque island across from the city, reached by the "Bridge of the 10,000 Ages."

The high pooped junks, with elaborate decoration on their sterns, form an interesting feature of the river life.

Foochow supplies much lumber from interior Fukien and huge lumber rafts can usually be seen in the river. An industry of note is that of lacquer ware, made by a secret process handed down from generation to generation of one Foochow family.

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Dr. Theodore Roosevelt

THERE died recently a certain eminent American whom few people knew —Dr. Theodore Roosevelt.

The reason they did not was because Roosevelt, statesman, and Roosevelt author, overshawed Roosevelt, LL.D., D.C.L., and PH.D.

All of which is something of a pity, for Roosevelt, the zoologist is entitled to eminence in his own right; moreover, it was the Roosevelt who displayed some extremely lovable characteristics not usually considered in the popular conception of Roosevelt, the Man.

Both upon his return from his African expedition and from his explorations in South America, Col. Roosevelt made his first reports upon his findings to the National Geographic Society in the form of lectures to its members. Both attest Col. Roosevelt's attainments as a naturalist and his extremely modest regard for his own achievements in the field of science.

Help Form Estimate of Roosevelt, the Man

These lectures are preserved in the archives of the Society. The former President's account of the incidents of these famous trips, and his concern that his associates should have proper credit, helps form a fullar estimate of Roosevelt.

For example, there is the following extract from Roosevelt's account of his African hunting expedition:

"My going to Africa as the head of a scientific expedition was first suggested to me by Dr. C. Hart Merriam. I then got into communication with one or two gentlemen connected with the scientific work here in Washington and they communicated with the Secretary of the Smithsonian, Mr. Walcott, who was then away from Washington. It was under Mr. Walcott, with Mr. Walcott as my superior officer, that I made my trip in Africa.

"The success of the trip from a scientific standpoint depended upon the character of the scientific men we had with us. It would be quite impossible to overstate the value of the service rendered by Dr. Mearns, Mr. Heller, and Mr. Loring. I doubt whether three men better equipped for their work and more zealous in doing their work ever went on such an expedition, and the labor fell entirely on them.

What Inspired His Co-workers' Enthusiasm

"Really, I would be ashamed of myself sometimes, for I felt as if I had all the fun. I would kill the rhinoceros, or whatever it was, and then they would go out and do the solid, hard work of preparing it. They would spend a day or two preserving the specimens, while I would go and get something else. At times I felt that it was a most unequal division of labor—that I was having the enjoyment, while the work of bringing practical results was being done by them, and it was being done by them not merely faithfully, but as a

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Zeser Had a Town and Country Tomb

"Like many of these ancient kings, Zeser was not content with a single tomb. He had another at Saqqara, near Memphis, where the chambers of the interior were lined with fine blue and green glazed tiles.

"A king who could rear such a structure had evidently at command the resources of a very well organized state and capable architects.

"Accuracy, 'equal to optician's work, but on a scale of acres instead of inches,' is scarcely what one expects in buildings reared nearly 5,000 years ago. But the huge blocks of the Great Pyramid, 2,300,000 of them weighing on an average 2½ tons apiece, while some run to 40 and 50 tons, are squared, fitted, and leveled with an accuracy which puts to shame our best modern work, and compels our respect not only for the strength, but for the skill of these mighty builders before the Lord.

"The question of how the Egyptians made fire was one that had often exercised archeologists. No representation of the process existed on the monuments, nor does the nation appear to have attached any religious significance to the origin of fire. The question was settled by the discovery at Kahun of a regular bow-drill for making fire, together with several sticks showing the burnt holes caused by fire-drilling.

Tomb Had All the Comforts of a Home

"In February, 1905, an American explorer, T. M. Davis, discovered the tomb of Yuaa and Thuaa, father and mother of that Queen Tyi whose influence played so great a part in Akhenaten's religious information.

"The tomb was intact, and the objects it contained were as perfectly preserved as if they had been shut up only a few weeks. One of the archeologists described his sensations on entering the place as being very much like those of a man who enters a town house which has been shut up for the summer. Armchairs stood about, beautifully carved and decorated with gold; the cushions on one of them stuffed with down, and covered with linen so perfectly preserved that they might have been sat upon or tossed about without injury. Two beds of fine design, decorated with gold, occupied another part of the chamber, while a light chariot, in perfect preservation, stood in a corner.

"Most startling of all was the discovery of a jar of honey, still liquid and still preserving its characteristic scent after 3,300 years."

labor of love. They did it so well because they would rather have done it than to have done anything else at all; they would rather have had that opportunity than to have had any other opportunity that the world that year gave, and naturally there was a particular pleasure in working with men who approached their work in such a spirit.

"I should also, in fairness, mention another member of the Roosevelt family, my own son Kermit, who did some excellent photograph work. Indeed, all the members of the expedition except myself, did good photographic work. Among the photographs we brought back there were the best photographs of wild elephants that have ever been taken, and the only photographs of living white rhinoceros that have ever been taken.

"I, of course, felt that I was bound to make a success of the trip, because in a certain sense my companions and myself were representing the United States. I think I can say that no other expedition of the kind has ever come back from Africa or Asia with a better collection of specimens than we brought back, the collection being especially good in the large game animals. The series of skins, and in many cases of skeletons, of the square-mouthed rhinoceros, reticulated giraffe, giant eland, bongo, northern sable antelope, white-withered lechwe antelope, and Vaughn's kob, for instance, are unrivaled in any European museum. We brought back, I think, all told, some 14,000 specimens of mammals, birds, reptiles, fishes, etc.

Preserving Specimens a Work of Patience

"Let me repeat, that I cannot overemphasize the part my companions played in the expedition. The chief value of the expedition came not from what I shot, but from what the naturalists, under the direction of Mr. Walcott, who were with us, did in preserving and collecting specimens. It is not a very hard thing to go off into the wilderness and kill an elephant, or a white rhino, or a reticulated giraffe, or giant eland, but it is a very hard thing to get good photographs of them and a still harder thing to cure and transport the skins and skulls of a number of such specimens. I can give you, perhaps, an idea of the amount of work done when I mention that we used on the trip ten tons of salt (all at times carried by native porters) in order to cure the skins; that when we killed elephants, for instance, we would have to use 20 men to carry each elephant's skull.

"I have never passed a more interesting eleven months than I passed in Africa. From the standpoint of the man interested in geography, in geology, in natural history, in ethnology, I do not know how any one could put in his time to a greater advantage than in a trip of that nature. I think that I can say that we did our work in such a manner as not to cast discredit upon the American nation, and I am extremely pleased that I should have had the chance to make my first speech on the subject under the auspices of this Society this evening."